

ADMINISTRATIVE-INTERNAL USE ONLY

DATA CENTER OPERATIONS BRANCH

NDS OPERATIONS PROCEDURE MANUAL
NO. P-D006

SYSTEMS SOFTWARE & HARDWARE
5 November 1985

PACK INITIALIZATION (DPREP)

SYMBOLIC TITLE: DPREP
PROGRAMMER:

25X1

ADMINISTRATIVE-INTERNAL USE ONLY

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CLASSIFICATION

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25X1

ADMINISTRATIVE-INTERNAL USE ONLY

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PACK INITIALIZATION (DPREP)

PURPOSE

1. There are several types of DPREP available on the NDS. This document sets forth the procedures to be used when initializing a disc pack on the operational or the M&A systems.

REFERENCES

2. Sperry/Univac Series 1100 Executive System, Operator Reference, UP-7928.8 Appendix E., DPREP 1100, pages E-1 through E-22 (current version).

RESPONSIBILITIES

3. The Shift Supervisor or the Assistant Shift Supervisor is responsible for carrying out this procedure under the direction of an Operations Control Officer.

APPLICABILITY

4. PREP33 - Used on the M&A System only

- * Used on the DCE, DCF, DCG, and DCH strings only which are Sperry 8433 disc drives. The DCI string, also on the M&A System, are Amperif 8470 fixed disc drives. These drives require a special prep and will not be documented in this procedure. If a prep is ever needed for these drives, SPB will assist Operations with the prep.

5. PREP34 - used on the Operational System only

- * Used on the DCA, DCB, DCC, and DCD strings only which are Amperif 8434 disc drives.

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PROCESSING

6. PREP33

a. Before starting the DPREP, put the pack being prepped into a spare drive and reserve (RV) that drive.

b. T DPREP (Operator keyin)

c. O-ENTER PREP PARAMETERS (DPREP prompt)

d. O PREP33 DHO T4 (Operator keyin)

* DHO = drive T4 = type T4 is the most commonly used type.
Unless directed otherwise by SPB, OSG T4.

e. LOAD DHO DHO DPREP (DPREP response)

f. FA DHO (Operator keyin)

FA = Forced Acknowledge

g. DHO RV * R PACKID DHO (DPREP response)

The next two DPREP prompts (h' & j) will come up only if a pack that has been used before is being prepped.

h. O-ADH ACCESS OK RUN PACK XXXXXX YN? (DPREP prompt)

XXXXXX is the current label on the pack. The pack label name will appear in place of XXXXXX.

i. O Y (Operator keyin)

j. O-ALLOW XXXXXX AS SUBSTITUTE PACK ON DHO YN? (DPREP prompt)

k. O Y (Operator response)

l. O-MORE? (DPREP prompt)

Let this delay sit until later.

m. 1-PREP33 DHO IS C.U. ON A WORD CHANNEL? YN (DPREP prompt)

n. 1 Y (Operator response)

o. DHO ID XXXXXX, PREVIOUS PREP FACTOR = 0112 (DPREP response)

p. 1-DHO, FILES WILL BE DESTROYED, CONTINUE? YN (DPREP prompt)

q. 1 Y (Operator keyin)

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r. 1-DHO, PACK TYPE & LABEL? FXXXXXX,RXXXXXX (DPREP prompt)

F = Fixed pack; R = Removable pack; XXXXXX = Six Char. pack name

s. 1 FMMFX00 or 1 RMMRM00 (Operator keyin)

The two names (FMMFX00 and RMMRM00) used are just examples. Use whatever name is required at the time.

t. 1 DHO ID MMRM00, PREP FACTOR? 28, 56, 112, 448 (DPREP prompt)

u. 1 112 (Operator keyin)

112 is always used. At this point, the prep will take place. It will run about 20 minutes. When it is done, it will send out the next prompt.

7. PREP34

a. Before starting the DPREP, put the pack being prepped into a spare drive and Reserve (RV) that drive.

b. ST DPREP (Operator keyin)

c. 0-ENTER PREP PARAMETERS (DPREP prompt)

d. 0 PREP34 DDO T4 (Operator keyin)

* DDO = drive, T4 = type; T4 is the most commonly used type.
Unless directed otherwise by SPB, use T4.

e. LOAD DDO DDO DPREP (DPREP response)

f. FA DDO (Operator keyin)

FA = Forced Acknowledge

g. DDO RV * R PACKID DDO (DPREP response)

h. 0-MORE? (DPREP prompt)

Let this delay sit until later.

i. 1-DDO, PACK TYPE & LABEL? FXXXXXX,RXXXXXX (DPREP prompt)

F = FIXED PACK; R = REMOVABLE PACK; XXXXXX = SIX CHAR. PACK NAME

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j. 1 FNSFX00 or 1 RNSRM00 (Operator keyin)

The two names used are just examples. Use whatever name is required at the time.

k. 1 DDO ID NSFX00, PREP FACTOR? 28, 56, 112, 448 (DPREP prompt)

l. 1 112 (Operator keyin)

m. 1-DDO ID NSFX00 PREP T4 TO USE ALTERNATE (DPREP prompt)

TRACKING? YN

n. 0 N (Operator keyin)

At this point, the prep will take place. It will run about 20 minutes. When it is done, it will send out the next prompt.

o. 1-DDO ID NSFX00, END ON LAST POS BOUNDARY? YN (DPREP prompt)

p. 1 Y (Operator keyin)

q. 1-DDO ID NSFX00, SELECT DIR TRK? N,CXXX HXX (DPREP prompt)

r. 1 N (Operator keyin)

s. 1-DDO ID NSFX00, ADD DIR TRACKS? N,X(X=1-7) (DPREP prompt)

t. 1 N (Operator keyin)

u. PREP34 DDO PREP T4 COMPLETE (DPREP response)

ANSWER OUTSTANDING DELAY WITH N OR PARAMETER (DPREP response)

At this point you can either continue with another pack by entering the parameters (see d.) or answering N which will end the prep.

ATTACHMENTS

8. Sperry/Univac Series 1100 Executive System, Operator Reference,
UP-7928.8 Appendix E., DPREP 1100, pages E-1 through E-22 (current version).

Appendix E. DPREP 1100

E.1. Online DPREP 1100

The DPREP 1100 software contains eight features. This software does an absolute assign of a reserved (RV) disk unit. To initiate a prep the pack must be mounted on a serviceable unit that is in the RV state. The system file *SYS\$*RUN\$ should also contain the runstream to start the prep, and the system file SYS\$*LIB\$ should contain the DPREP 1100 absolute element. There are unique DPREP 1100 absolute elements for each of the major Series 1100 System groups. The elements used for prepping are DPREP80 (1100/80), DPREP60 (1100/60).

The following subsections describe the eight prep features.

E.1.1. Type 1: Write Home Address

The Write Home Address feature writes home addresses on a pack that does not have formatted tracks; i.e., the pack contains only index marks or the home addresses have been obliterated. The prep writes only the home address on each physical disk track; no records are formatted for Executive use. If the home address cannot be written, the track is skipped upon operator request. Performing the prep on an EXEC formatted pack destroys the data information contained on the pack but it does not destroy any bad track flags. If the home address is unreadable, the operator must rewrite the home address to obtain skip displacement and bad track capability. If the home address is not rewritten, the home address is flagged bad in the bit map. Warnings are provided to prevent inadvertent destruction of the data.

The Write Home Address feature is used for 8470 disks only when so many home address fields are destroyed that it is not feasible to allow selective track formatting.

Type 1 prep is not available for Solid State Disks.

E.1.2. Type 2: Print Bad Track History

Prerequisite: The pack must be a factory-certified pack or prep Type 3 or a Type 5 must have been performed previously. Type 3 is not available with word channel control units or 8450-94/95 (Compatible mode only) drives.

The Print Bad Track History provides hard copy listing that designates the tracks that are flagged as defective and the origin of the bad track flag. There are five kinds of defectively flagged bad tracks: flagged defective onsite; reserved for PTS testing; factory-certified defective; tracks flagged bad because the home address cannot be written; and unavailable track (8450 and 8470 only). This feature performs read-only functions and does not alter any information on the pack.

Type 2 prep is not available on Solid State Disk.

E.1.3. Type 3: Track Dropout (5039)

The Track Dropout routine destroys any data that is contained on the pack. Warnings are provided to prevent inadvertent destruction of data. The operator is queried (solicited) using a menu of selections for this operation. Automatic badspotting can also be used, depending on what the operator selects. A printout is provided of all tracks that fail to support data. If automatic badspotting is not selected, defective tracks may be flagged using Prep Type 5. Data analysis is not performed on tracks that were flagged defective previously. This type is not available on the word control units, and 8450-94/95 (Compatible mode only) drives.

Type 3 prep is not available on Solid State Disk.

E.1.4. Type 3: Skip Generation (5046, 5056 Control Unit and 8450-94/95 Disk Only)

The Skip Generation routine generates skip displacements for the hardware to use; it allows the hardware to ignore imperfect areas on the disk surface. Up to three skips may be generated for a track without needing to down the track. A Type 4 prep must be used following a Type 3 prep.

E.1.5. Type 4: New Prep

Prerequisite: Defective tracks should have been flagged previously by factory certification, or by performing a Type 1 prep, or a Type 3 prep. (Note the above restrictions.) If a Type 1 prep has resulted in a skipped home address, the appropriate track is flagged "bad" or unavailable in the bit map. Warnings are provided to prevent inadvertent prep of a previously EXEC formatted pack. The New Prep (Type 4) solicits information from the operator at the console. The solicited information includes: the pack label; prep factor; location of the directory track; and additional directory tracks.

Note that when prepping a track, the New Prep routine reads the home address and track descriptor record (RO). Only if these are read without encountering the defective track indicator in the home address is the prep of the track actually performed. If the home address is unreadable, it is flagged bad at the operator's request. The bad track is indicated in EXEC hardware and software bit maps.

For 8434, 8450, and 8470 disks that are used on 5046/5056 control units, the new (or full) prep may be run in either of two modes; the mode is selected by the operator's response to the following message:

0 - devnam ID pack-id ·PREP T4 TO USE ALTERNATE TRACKING? YN

A Y response results in DPREP 1100 formatting defective tracks in such a way that an alternate tracking access mechanism can be used by the 5046/5056 control unit logic. This is described in E.1.5.1. An N response results in DPREP 1100 formatting defective tracks in a nonalternate tracking (more traditional) manner, described in E.1.5.2.

E.1.5.1. Alternate Tracking

Each physical disk track has a "header" section, which normally cannot be addressed by a user program. It contains addressing and status information. A track may be marked as defective in a "flag" byte of the header section.

The alternate tracking concept provides that a disk track marked as defective may be formatted to cross-reference another track (non-defective) that is used as its alternate. The cross-referencing and indirect accessing of data then proceeds in a manner entirely transparent to both the user program and the Executive System.

Alternate tracking restrictions in DPREP 1100:

- Not used to or from CE or PTS-reserved tracks.
- Not used on 8450-02 or 8470-02 fixed heads.
- Alternate tracks flagged as defective will not have alternates (the indirect access is one level only).

Alternate tracking advantages:

- For a given disk type there is a guaranteed amount of storage space available.
- Factory-certified defective tracks may point to alternates.
- Any disk may be prepped for disk resident system use. (Without alternate tracking, any disk having defective tracks in the bootstrap area must be rejected for DRS use.)
- Required for using disk copy.

One possible disadvantage of alternate tracking is that a small portion of the disk surface (less than one percent) is reserved for alternate tracks.

These reserved areas are as follows:

- 8434 - Cylinders 878-884 inclusive.
- 8450 - Cylinders 555-559 inclusive.
- 8470 - Cylinders 625-629 inclusive.

As indicated in E.1.5, the DPREP 1100 setup of alternate tracking format is initiated by operator response to a console query. The site technical management decided whether alternate tracking will be used.

E.1.5.2. Nonalternate Tracking

When the full prep is run in this mode, the pack is repped without destroying bad track history. Factory-certified defective tracks are never repped. When any other track is flagged as defective, the software writes the RO with a 4-byte data field specifying EXEC in ASCII. This allows a reprep of a software marked defective track and uniquely identifies those tracks marked as defective by the manufacturer and by the software. In addition to writing the home address and RO, the remaining portion of the track is erased. Also, the EXEC hardware and software bit maps are updated to reflect the bad track.

In this mode, a Type 4 prep on an 8450 or 8470 disk drive requests the size at which the pack should be prepped:

0 - *devnam* ID *pack-id* PREP T4 PREP STANDARD SIZE? YN

A "standard size" prep will prep the pack and mark the tracks on five cylinders as unavailable. These tracks, then, will automatically be allocated for any defective tracks found elsewhere on the pack. A "nonstandard size" prep will prep the entire pack, less any defective tracks.

The "standard size" prep is not available for 8434 disk packs.

E.1.6. Type 5: Partial Prep

The partial prep provides the user with the alternatives described below. If applicable, these may be used instead of a Type 4 prep.

■ Reinitialize (reprep).

Reinitializing returns a pack to the newly prepped (Type 4) state. The pack must have been originally prepped using the Type 4 prep, either with or without the alternate tracking format (see sections E.1.5.1 and E.1.5.2). Reinitialization rewrites the Software Master Bit Table (SMBT) with the Hardware Master Bit Table (HMBT). This process destroys reference to user data files as though a Type 4 prep had been run.

■ Change pack type identification.

NOTE: *Disk type (fixed or removable) or disk identifiers should not be altered after system registration occurs.*

These options are provided for quick disk replacement of disabled disks, or if an incorrect *pack-id* or type (F or R) is entered during a Type 4 prep.

Quick disk replacement of disabled disks keeps a prepped pack that is unregistered and free of files on the shelf. If the need arises, this pack can be used to replace a disabled disk by changing the type (F or R) and duplicating the *pack-id* that is disabled. The new pack can be reloaded without performing an entire Type 4 prep.

■ Change individual track status without full pack reprep.

Track status (up/down) may be changed on either prepped (operating system formatted) or unprepped disk packs. This enables the operator to up or down a track without disturbing other data files.

DPREP 1100 will issue the console message:

0 - *devnam* ID *pack-id* UP/DOWN TRK? N,Uxxx-xx,Dxxx-xx

An 'N' response will, of course, terminate this mode.

Otherwise, a message appears, if the following two conditions are met:

■ The unit is an 8434, 8450 or 8470 unit.

■ The operator response does not reference a CE- or PTS-reserved track or a fixed head area on 8450 or 8470.

The message is:

O - *devnam* ID *pack-id* PREP T5 TO USE ALTERNATE TRACKING? YN

(Operators and other site personnel should familiarize themselves with the concept of alternate tracking as described in E.1.5.1. 5046/5056 control units.)

When the operator specifies that a track is to be downed (a cylinder-head combination) and also answers "Y" to the alternate tracking query, DPREP 1100 will normally proceed as follows:

- The flag byte of the referenced track marks the track as defective.
- An alternate for the referenced track is chosen from the area of potential alternates (see addresses, E.1.5.1). If no more are available, the operator is informed of this by a system console message and the request is serviced in nonalternate tracking mode.
- The alternate track is marked as an alternate in its flag byte.
- The defective-alternate pair of tracks is setup (in the header addressing areas) to cross-reference one another.
- The alternate track is prepped for use.
- In the master bit tables, the defective track is marked available (for system use) and the alternate track is marked unavailable.

The preceding list describes the basic work of DPREP 1100 alternate tracking and is the "definitive case" for its use.

Other situations may occur that involve the alternate tracking process, but where the operator request must be treated differently:

- The down keyin references a potential alternate track; the track is marked defective with no alternate track of its own.
- The down keyin references an alternate track that is already cross-referenced to a defective track. If the defective track is marked allocated in the software master bit table, a warning message appears on the system console; the operator must key in consent before the request is processed. Otherwise, a new alternate track is provided and the referenced track is marked defective with no alternate track of its own.
- The down keyin references a defective track that is already cross-referenced to an alternate track; the situation is identified by a system console message, but no further action is taken.
- An up keyin references a primary track that is not cross-referenced to an alternate; the defective bit in the flag byte is cleared, and the track is marked as available in the master bit tables. (The term "primary" is used to describe a track located outside the disk area reserved for alternate tracks.
- An up keyin references a defective track already cross-referenced to an alternate track; both primary and alternate are returned to "ready" status; i.e., defective and alternate bits are cleared, cross-referencing is removed, and the alternate is returned to the pool of available alternate tracks.

■ An up keyin references a potential (i.e., available) alternate track. If the operator responds "Y" to the alternate tracking query, the operator receives a warning message but no further action is taken. Otherwise, the track is "upped" as always, defective and alternate flag bits are cleared, the track is prepped for system use, and master bit tables are marked accordingly.

■ An up keyin references an alternate track that is already cross-referenced to a defective track. A system console message appears but no further action is taken.

NOTE: *In all cases where the master bit table reference can be changed to already-allocated customer data, DPREP 1100 will query the operator. The operator must respond with the appropriate console keyin before DPREP 1100 will proceed.*

Before the Type 5 prep can use alternate tracking on 8450 or 8470 disks, either of the following must have occurred:

■ A successful Type 4 prep that specified use of alternate tracking was run on the pack, (see E.1.5.1).

■ A successful Type 4 prep that specified PREP STANDARD SIZE was run on the pack, (see E.1.5.2).

Before alternate tracking can be used by the Type 5 prep on 8434 disks, a successful Type 4 prep that specified use of alternate tracking must be run.

If the following Type 5 prep console message receives an 'N' response from the operator, DPREP 1100 formats defective tracks in a nonalternate tracking (more traditional) manner, as described in E.1.5.2.

0 - devnam ID pack-id PREP T5 TO USE ALTERNATE TRACKING? YN

Disk track reprep is inhibited under the following conditions:

1. A keyin requests upping of a track that factory certification flagged defective.
2. The control unit signifies an unsuccessful reprep.
3. The reprep will alter the physical track 0 (VOL 1), the directory area, or a reserved EXEC area.

If customer data resides on the affected track, an operator decision is required if the track will be flagged defective.

Information from error log programs may be used for input when operating a Type 5 prep. This allows permanent badspotting of tracks that have a history of recoverable data errors before the errors become unrecoverable.

To maintain a standard size 8450 or 8470 type disk, a track that resides in the unavailable area (8450, cylinders 555-559; 8470, cylinders 625-629) must be marked up whenever a track that resides in the standard area. The operator can accomplish this using an "Uxxx-xx-" keyin. an additional console keyin.

Messages are provided for the inhibited areas because the reprep is not allowed.

Type 5 prep is not available on Solid State Disk.

E.1.7. Type 6: Prep Verify

Prerequisite: The pack must have previously been prepped in EXEC format.

The Prep Verify routine performs data write, read, and verify by mass storage track format in areas where no customer data is residing. For areas where VOL1, Directory Track and customer data is residing, the routine performs two reads; it compares the first read with the second read for data verification. This routine may be used on any previously prepped EXEC format packs. The Type 6 Prep Verify does not alter the pack data nor does it mark tracks as defective when the data has a compare discrepancy. The operator may use a Type 5 prep to down any tracks that are found defective by the Prep Verify routine.

Type 6 prep is not available on Solid State Disk.

E.1.8. Type 7: Disk Resident System (DRS) Prep

Prerequisite: The Type 7, DRS prep routine must follow a Type 4 prep when formatting the pack for the disk resident system (DRS). The DRS Prep is inhibited when either defective tracks or customer data resides in the area that will be reserved for the DRS area. If any such defective tracks are cross-referenced to alternate tracks, then the restriction may be removed.

5046/5056 Disk Format

For DRS packs prepped on 5046 and 5056 control units, the format of cylinder 0, head 0, is the same as for any other pack prepped on the control unit. The Initial Program Load (IPL) block starts with the record following VOL 1 (i.e. record 4) and continues across any subsequent records for 2000_g words. The difference between DRS and non-DRS packs that are prepped by the word control unit is a flag in VOL1. The flag prevents data corruption that can occur because the operator inadvertently boots to the wrong pack. Disk packs are not compatible between word channel and byte channel control units for Initial Program Load (IPL) operations.

Type 7 prep is not available on Solid State Disk.

E.1.9. Type 8: Print VOL1 And Directory Track

If the disk is prepped in EXEC format, the Type 8 feature provides a hardcopy listing of VOL1 and the first directory track. It provides the user with complete information on file status and defective tracks on the disk; these are represented by bits located in the hardware and software master bit tables within the directory track.

In addition, the operator may print the data in any area of the disk (except CO HO on DRS prepped disks) by responding to an answerable console message with the appropriate cylinder and head keyins. Attempts to print tracks on unprepped disks may result in status errors because of attempts to read records that do not exist. Records that are readable, however, are printed.

E.1.10. Recommended Use

This section describes recommended use of a DPREP 1100 for common situations.

E.1.10.1. Prepping A New Pack

To prep a pack that has not been previously prepped by DPREP 1100 (new pack):

1. Perform a Type 1, Type 3, and Type 4 prep. Type 3 is not available on word channel and compatible mode 8450 units.
2. Perform a Type 6 prep.
3. Perform a Type 5 prep to down tracks that present data related errors during operation of a Type 6 prep.
4. Perform a Type 2 prep to obtain a new list of defective tracks.

The operator must perform a Type 1 prep on all new (from the manufacturer) packs to destroy any alternate track flags that may have been written to support tracks found defective. If the operator does not do this, the Operating System will encounter track condition checks when accessing these tracks.

NOTE: A Type 1 prep should not be performed for 8470 disk packs except as noted in E.1.1.

E.1.10.2. Prepping Previously Prepped Packs

To prep a pack previously prepped by DPREP 1100:

1. Perform a Type 4 prep.
2. Perform a Type 6 prep.
3. Perform a Type 5 prep to down tracks that present data related errors during operation of a Type 6 prep.
4. Perform a Type 2 prep to obtain a new list of defective tracks.

E.1.10.3. Prepping a New Disk Resident System (DRS) Pack

To prep a DRS pack that has not been previously prepped by DPREP 1100 (new pack):

1. Perform a Type 1, Type 3, and Type 4 prep. Type 3 is restricted in that it is not available on the word channel control units. For 8470 disks, perform a Type 3 prep and a Type 4 prep.
2. Perform a Type 6 prep.
3. Perform a Type 5 prep to down tracks that present data related errors during operation of a Type 6 prep. If defective tracks exist in the area that will be reserved for DRS use, a Type 7 prep will be inhibited.
4. Perform a Type 7 prep.
5. Perform a Type 2 prep to obtain a new list of defective tracks.

The operator must perform a Type 1 prep on all new (from the manufacturer) packs to destroy any alternate track flags that may have been written to support tracks found defective. If this is not done, the operating system will encounter track condition checks when accessing these tracks.

NOTE: A Type 1 prep should not be performed for 8470 disk packs except as noted in E.1.1.

E.1.10.4. Previously-Prepped Disk Resident System (DRS) Pack

To prep a DRS pack that has been previously prepped by DPREP 1100:

1. Perform a Type 4 prep.
2. If a list of known defective tracks is available, the operator should also use a Type 5 prep. If defective tracks reside in the area that will be reserved for DRS use, a Type 7 prep will be inhibited.
3. Perform a Type 7 prep.
4. Perform a Type 2 prep to obtain a new list of defective tracks.

E.1.10.5. Defective Track Reprep

To reprep a previously-suspected defective track, perform a Type 5 prep, upping the suspected track.

E.1.10.6. Downing a Defective Track

To down a defective track:

1. Perform a Type 5 prep, downing defective track.
2. Perform a Type 2 to obtain a new list of defective tracks.

E.1.10.7. Testing for Additional Defective Tracks

To test a prepped pack that is suspected of having additional but available defective tracks, perform a Type 6 prep. This will not destroy the pack contents.

E.1.10.8. Reading Suspected Area of Pack

To read a suspected area of a prepped pack and/or to read VOL1 and the first directory track of a prepped pack, perform a Type 8 prep. If desired, the operator should supply the cylinder, head of the area will be read.

E.1.10.9. Surface Analysis

Surface analysis is not available on the 5046 and 5056 control units.

To do a complete surface analysis of a pack that the operator suspects is unable to retain data:

1. Perform a Type 1 prep, and Type 3 prep. Type 3 is restricted as noted.
2. If the pack is usable, the operator should restore it using a Type 4 prep.

E.1.10.10. Skip Defect Generation

Skip Defect is available only on 5040, 5056, and 5057 control units and 8450-94/95 disk.

1. Pack must be prepped via a Type 4 prep.
2. Perform a Type 6 prep to locate any suspect tracks.
3. Perform a Type 3 prep on suspect tracks only.
4. Perform a Type 4 prep to re-~~prep~~ the pack.

E.1.10.11. Prepping an SSD Pack

1. Perform a Type 4 prep.
2. Perform a Type 8 prep to snap on directory track and any desired track.

E.2. Runstream

A runstream is contained in `SYSS*RUN$` that may be started using a Start (ST) keyin.

ST DPREP

To initiate a prep, the runstream contains a call to @DPREP. Since @DPREP, which is in `SYSS*LIB$`, does an absolute assign, the operator must mount the pack on a reserved (RV) unit. The account number/user-id must be correct to pass the absolute assignment checks of the Executive.

Before allowing any absolute assignment of a previously prepped pack, the operator must respond "Y" to the following console messages:

O - ALLOW *pack-id* AS SUBSTITUTE PACK ON *devnam* YN?

O - ADH ACCESS OK RUN *run-id* PACK *pack-id* YN?

Operator approval and the correct account number/user-id are necessary for using DPREP.

E.3. Summary of DPREP 1100 Messages

E.3.1. PREP Initiation

See Table E-1 for prep initiation console messages.

Table E-1. Prep Initiation Messages

Message	Description/Response
ST DPREP (unsolicited keyin) ENTER PREP PARAMETERS	<p>Initiates runstream to load PTS software</p> <p>Respond with</p> <p>O PREP <i>xx devnam Tx (xxxxxx)</i> . <i>cccc</i></p> <p>where:</p> <p>PREP <i>xx</i> PREP05 - for 8405 type drive PREP30 - for 8430 type drive PREP33 - for 8433 type drive PREP34 - for 8434 type drive PREP50 - for 8450 type drive PREP70 - for 8470 type drives PREPSA - for SSD drives</p> <p><i>devnam</i> Operating system's mnemonic name for the device to be prepped.</p> <p><i>Tx</i> Type number T1 = Write Home Address T2 = Print Bad Track History T3 = Surface Analysis † T4 = New Prep T5 = Partial Prep T6 = Prep Verify T7 = DRS Prep T8 = Print VOL1 and Directory Track</p> <p>NOTE: † Surface analysis is not available on some control units (see E.1.3.1). Multiple keyins are allowed; e.g., T4,6 Type 4 and Type 6 will be performed T4,6,7 Types 4, 6, and 7 will be performed Types are performed in numerical order</p> <p>(<i>xxxxxx</i>) 6 character <i>pack-id</i>. If <i>pack-id</i> is not included in prep initialization, a default <i>pack-id</i> consisting of <i>devnam</i> without special characters is substituted.</p> <p><i>cccc</i> Control unit type (5039, 5046, or 5056) Applicable to 8405, 8430, 8433</p>
LOAD (<i>pack-id</i>)	Mount pack to be prepped on reserved drive. (If 8405, load message not used.)
FA <i>devnam</i> (unsolicited keyin)	Generates attention interrupt. (Not required for 8405)
ALLOW <i>pack-id</i> AS SUBSTITUTE PACK ON <i>devnam</i> YN?	O Y Prep will proceed. O N Pack assign is inhibited.
ADH ACCESS OK RUN (<i>run-id</i>) PACK (<i>pack-id</i>) YN	O Y Direct pack assign is allowed. O N Pack assign is inhibited.

Table E-1. Prep Inmanon Messages (continued)

Message	Description/Response
MORE?	Message remains on console screen; additional parameters may be entered to start preps on additional drives. O N No additional parameters. Further parameters cannot be entered, and the DPREP run will automatically "FIN" when current prep activities are completed. O PREP <i>xx devnam</i> T <i>xx (xxxxxx)</i> - To start additional preps.
ANSWER OUTSTANDING MESSAGE WITH N OR PARAMETER	All requested prepping activities have completed, and the "MORE?" message is still outstanding.
II <i>run-id</i> (unsolicited keyin)	Allows entry of additional parameters after the "MORE?" message has been answered with "N".
PREP <i>xx devnam</i> , IS C.U. ON A WORD CHANNEL? Y,N	Applicable to 8405, 8430, 8433 disk drives, and will appear if the control unit type is omitted on the initializing parameter.
PREP <i>xx devnam</i> , WHAT IS THE CONTROL UNIT TYPE?	Applies when the "N" was entered for the previous question. O 5039 Enter for 5039 control unit O 5040 Enter for 5040 control unit O 5048 Enter for 5048 or 5056 control unit O 5056 Enter for 5048 or 5056 control unit O 5057 Enter for 5057 Control Unit

E.3.2. Other Necessary Messages by Feature Type

See Table E-2 for other necessary messages by feature type.

Table E-2. Other Necessary Messages by Feature Type

Message	Description/Response
PREP TYPES 2, 7	No solicited messages.
TYPE 3 PREP PREP <i>xx devnam</i> , WANT AUTO BADSPOTTING? Y,N	Restricted as noted. O Y Data verify errors will cause track to be flagged defective. O N Data verify errors will be output to system HSP.

Table E-2. Other Necessary Messages by Feature Type (continued)

Message	Description/Response
PREP <i>xx devnam</i> , ENTER 12 CHARACTER PATTERN OR N	O <i>pppppppppppp</i> Characters entered (0-9) will be used for data verify.
	O N Default pattern of 777777777777 will be used.
PREP <i>xx devnam</i> NO TYPE 3 ON CU, CONTINUE? Y,N	O Y Continue other selected features.
	O N Prep termination
TYPE 3 PREP - Skip Defect	S Sela input - user may enter skip defects
PREP <i>xx devnam</i> , SELA INPUT OR AUTO? S OR A	A Auto - DPREP will generate and insert up to 3 skip defects.
If response is A	
ENTER <i>Cxxx Hxxx</i> OR N	If cylinder and head are not included on prep initialization, they will be solicited.
	O N test will complete
	<i>Cxxx Hxxx</i> cylinder and head to test
If response is S	
ENTER <i>Cxxx Hxxx</i> OR N	O N test will complete
	<i>Cxxx Hxxx</i> cylinder and head to test
ENTER SB7 <i>xxx</i> (3 OCTAL DIGITS) OR N	<i>xxx</i> SB7 information
ENTER SB12 <i>xxx</i> (3 OCTAL DIGITS) OR N	O N solicit new cylinder and head
	<i>xxx</i> SB12 information
ENTER SB18-19 <i>xxxxxx</i> (6 OCTAL DIGITS) OR N	O N solicit new cylinder and head
	<i>xxxxxx</i> SB18-19 information
	O N solicit new cylinder and head
TYPE 4 PREP	
<i>devnam</i> PACK TYPE AND LABEL?	O <i>Fxxxxxx</i> F=Fixed pack, x=up to 6 character alpha/numeric label.
<i>Fxxxxxx</i> , <i>Rxxxxxx</i>	O <i>Rxxxxxx</i> R=Removable pack, x=up to 6 character alphanumeric label.
If 8405 disk drive:	
<i>devnam</i> , FIXED DISK LABEL?	
<i>Fxxxxxx</i>	
<i>devnam</i> ID <i>xxxxxx</i> PREP FACTOR? 28, 58, 112	<i>xxxxxx</i> Pack label.
	O 28 Pack prep factor.
	O 58
	O 112

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Table E-2. Other Necessary Messages by Feature Type (continued)

Message	Description/Response
If 8434, 8450 or 8470 disk drive on 5046/5056 C.U. devnam ID xxxxxx, PREP FACTOR? 28, 56, 112, 448	xxxxxx Pack label. 0 28 Pack prep factor. 0 56 0 112 0 448 <i>NOTE:</i> 448-word prep is not to be selected if the pack is a fixed pack or DRS pack or drive is 8450-94/95 (Compatible mode only).
If 8450 Disk on 5057 control unit: devnam ID xxxxxx, PREP FACTOR? 28, 56, 112, 448	xxxxxx pack label. 0 28 prep factor 0 56 0 112 0 448 <i>NOTE:</i> 448 prep factor is allowed on fixed, removable, or DRS pack under 5057 control unit.
If 8450-94/95 disk: devnam ID xxxxxx, PREP FACTOR? 112, 448	xxxxxx pack label 112 prep factor 448 <i>NOTE:</i> 448-word preps not to be selected if the pack is a fixed or a DRS pack.
If 8470 disk on 5057 control unit: devnam ID xxxxxx, PREP FACTOR? 28, 56, 112, 448, 1792	xxxxxx pack label 28 prep factor 56 112 448 1792 <i>NOTE:</i> 448 prep is not allowed on fixed pack or DRS pack. 1792 prep is allowed on all types of 8470 pack.
If 8450 or 8470 disk drive: run-id* devnam ID xxxxxx, PREP STANDARD SIZE? Y N	xxxxxx Pack label. 0 Y Prep the entire 8450 but limit the usable size of the disk to the standard number of cylinders (555). Use all physical tracks contained in cylinders 0 through 554, plus enough additional tracks in cylinders 555 through 559 to maintain the standard size.

Table E-2. Other Necessary Messages by Feature Type (continued)

Message	Description/Response	
<p>If 8405, 8470, or 8433 disk drive: <i>devnam</i> ID <i>xxxxxx</i>, ADD PTS RESERVED TRACKS? Y,N</p> <p><i>devnam</i> ID <i>xxxxxx</i> SELECT DIR TRK? N,Cxxx Hxx</p> <p>If 8434, 8450-00/01, or 8470 disk drive on word control unit: <i>devnam</i> ID <i>xxxxxx</i> END ON LAST POS BOUNDARY? Y,N</p> <p><i>devnam</i> ID <i>xxxxxx</i> ADD DIR TRACKS N,x (x=1-8)</p> <p>If 8434 or 8450 disk drive: <i>devnam</i> ID <i>xxxxxx</i> ADD DIR TRACKS? N,x (x = 1-7)</p> <p>If 8470 disk drive: <i>devnam</i> ID <i>xxxxxx</i> ADD DIR TRACKS? N,x (x = 1-4)</p>	O N	Prep and make available all physical tracks on cylinders 0 through 559 except those tracks which are marked defective. NOTE: The fixed storage area, available on 8450-02/03 disks, is always used.
	xxxxxx	Pack Label.
	O N	Do not add PTS test tracks.
	O Y	Allow inclusion of PTS test tracks.
	xxxxxx	Pack label.
	O N	Directory Track is placed 1/3 of way into pack.
	O Cxxx	Cxxx (decimal cylinder).
	O Hxx	Hxx (decimal head).
		Directory Track is placed at first unallocated sector-formatted track in requested cylinder/head area.
	xxxxxx	Pack label.
<p>TYPE 5 PREP <i>devnam</i> ID <i>xxxxxx</i>, REINITIALIZE (REPREP) DISK? Y,N</p> <p>DATA WILL BE DESTROYED IF PACK <i>xxxxxx</i> RE-PREPPE</p> <p><i>devnam</i>, CONTINUE PREP T 5? Y,N</p>	O Y	Allocates remaining tracks past the last full position on unit.
	O N	Leave remaining tracks past the last full position unallocated.
	xxxxxx	Pack label.
	O N	One Directory Track on pack.
	O x	x =(1-8) Additional Directory Tracks.
	xxxxxx	Pack label.
	O N	By-pass reinitialize.
	O Y	Allow reinitialize.
	O N	By-pass reinitialize.
	O Y	Continue reinitialize.

Table E-2. Other Necessary Messages by Feature Type (continued)

Message	Description/Response
<p><i>devnam</i> ID <i>xxxxxx</i>, CHANGE ID OR TYPE? Y,N</p> <p><i>devnam</i>, PROVIDE NEW PACK ID. F<i>xxxxxx</i>, R<i>xxxxxx</i></p> <p><i>devnam</i> ID <i>xxxxxx</i> UP/DOWN TRACK? N,U<i>xxx-xx</i>, D<i>xxx-xx</i></p> <p>TYPE 6 PREP</p> <p><i>devnam</i> ID <i>xxxxxx</i> CYL/HD RNGE? C<i>xxx-xxx</i> H<i>xx-xx</i>_ALL</p> <p>PREP <i>xx devnam</i>, ENTER 12 CHARACTER PATTERN OR N</p>	<p><i>xxxxxx</i> Pack label.</p> <p>O N No change</p> <p>O Y Allow changes of pack type or ID.</p> <p>O F<i>xxxxxx</i> F = Fixed pack, <i>x</i> = up to 6 character alphanumeric label.</p> <p>O R<i>xxxxxx</i> R = Removeable pack, <i>x</i> = up to 6 character alphanumeric label.</p> <p><i>xxxxxx</i> Pack label.</p> <p>O N Terminates prep Type 5.</p> <p>O U<i>xxx-xx</i> To up a physical track.</p> <p>O D<i>xxx-xx</i> To down a physical track.</p> <p>where: <i>xxx</i>=decimal cylinder —separator <i>xx</i>=decimal head</p> <p><i>xxxxxx</i> Pack label or none.</p> <p>O ALL Entire-disk surface is tested.</p> <p>O C<i>xxx-xxx</i> H<i>xx-xx</i> - Select start and end cylinder and head to be tested.</p> <p>NOTE: Example C100-200 H00-18, decimal head 0 through 18 are tested on decimal cylinders 100 through 200.</p> <p>O <i>pppppppppppp</i> - Character entered (0-9) will be used for data verify.</p> <p>O N Default random data pattern will be used.</p>
<p>TYPE 8 PREP</p> <p><i>devnam</i> ID <i>xxxxxx</i>, SNAP TRACK TO HSP? N, C<i>xxx</i> H<i>xx</i></p> <p><i>devnam</i> ID <i>xxxxxx</i>, SNAP SSD TRACK TO HSP? N, T<i>xxx</i>, W<i>xxxxxx</i></p>	<p>O N Terminates Prep Type 8</p> <p>O C<i>xxx</i> H<i>xx</i> Specifies disk track to be printed. If the track is good, the track's home address and records are printed. If the track is flagged defective, the track's home address and RO are printed.</p> <p>O N Terminates Type 8 prep.</p> <p>O T<i>xxx</i> Specifies FASTRAND track to SNAP printer. Range = 0-511.</p> <p>O W<i>xxxxxx</i> Track containing given word will be snapped. Range = 0-917,503.</p>

Following the execution of each feature, one of the following messages is displayed:

PREPxx devnam Txx COMPLETE

The preceding message indicates successful completion of the DPREP routine.

PREPxx devnam Txx ABNORMAL TERMINATION

This second message indicates unsuccessful completion of the DPREP routine. The user should examine the printed output to determine the cause of error. Printer output is discussed in E.4.

E.3.3. Console Response Messages

During execution of the features, console response messages due to illegal format, device status, etc., will be displayed. See Table E-3 for these console messages.

Table E-3. Console Messages

Message	Description/Response
devnam INVALID PREP FACTOR	Keyin error - WDS/REC parameter is automatically resolicited. Correct entries are 28, 56, 112, 448.
devnam IDxxxxxx PREVIOUS PREP FACTOR=xx	Informative message concerning pack profile.
devnam, FILES WILL BE DESTROYED, CONTINUE? Y,N	O N Prep terminates O Y Prep type selected continues, pack files are lost and pack is reformatted.
devnam KEY ERROR	Keyin error - parameters are resolicited
devnam, UNLABELED PACK - NO VOLUME 1	Pack is not prepped, or device is not operating correctly.
devnam, CYL HD, CANNOT READ HOME ADDRESS	Prep is terminated - cannot read home address to find track condition.
devnam, CYL HD, CANNOT FLAG BAD TRACK	Unable to down a track.
devnam, PACKID IS ALPHA-NUMERIC ONLY	Pack ID label key in error - label is resolicited.
CYL HD, CANNOT WRITE HOME ADDRESS	Cannot write the Home Address prep of the track.
devnam CYL HD CANNOT RD HM ADRS, FLAG BAD? YN	O Y Notes track bad for Bit Map flag and continues. O N Prep terminates

Table E-3. Console Messages (continued)

Message	Description/Response
<i>devnam</i> 3 TRACKS H.A. NOT WRITTEN. CONTINUE YN	O Y Flags all additional home addresses that cannot be written as bad. O N Prep terminates.
<i>devnam</i> CYL HD H.A. BAD FLAG BAD? YN	O Y Prep sets Bit Map as a hardware bad track and logs track for printing. O N Prep terminates.
<i>devnam</i> 3 UNREADABLE H.A. CONTINUE YN	O Y Flags all additional unreadable home addresses as bad in Bit Map and logs for printing. O N Prep terminates.
<i>devnam</i> FOLLOWING TRACKS FLAGGED BAD BY PROGRAM	Prelude to printing program bad tracks.
<i>devnam</i> CYL HD FLAGGED BAD IN BIT MAP	Printout of bad tracks in Bit Map that were program defined.
PREP <i>xx devnam</i> REWRITE ALL H.A. MAY DESTROY FLAG BYTES	Warns operator that the answering of the following messages could cause a condition that will destroy disk flag bytes.
PREP <i>xx devnam</i> CYL HD H.A. UNREADABLE, REWRITE YN	O Y Prep continues trying to rewrite home address field on disk. O N Flags as down in Bit Map.
PREP <i>xx devnam</i> 7 TRACKS UNREADABLE REWRITE YN	O Y Prep rewrites this home address and all additional unreadable home addresses that are found. O N Prep terminates.
PREP <i>xx devnam</i> REWRITE ALL H.A. WILL DESTROY SD BYTES:	A warning message indicating that continuing will destroy the skip displacement bytes.
<i>devnam</i> , CANNOT READ VOL1 OR DIRECTORY TRACK	The directory area of the pack has been destroyed, or the device is not operating correctly.
PREP <i>xx</i> , CONTINUE PREP TYPE? Y,N	O - N Prep is aborted. O - Y Prep continues.
<i>devnam</i> - CANNOT FIND UNALLOCATED AREA FOR DIR TRK	Area selected for the directory track is allocated and all other areas are allocated to the end of the pack surface.

Table E-3. Console Messages (continued)

Message	Description/Response
<i>devnam</i> , INVALID PARAMETER	An invalid CYL or HEAD entry has been made.
<i>devnam</i> ID, CYL HD PREVIOUSLY DOWNED	Type 5 prep is attempting to mark a track defective that is already flagged defective.
<i>devnam</i> ID, CYL HD CONTAINS DATA FILE	Type 5 prep is attempting to down a track that contains customer files.
<i>devnam</i> ID, CYL HD FACTORY BAD TRACK	Type 5 prep is attempting to up a track that is marked defective by factory certification.
<i>devnam</i> ID, CYL HD STATUS UNCHANGED TO DETERMINE REASON, SNAP TRACK VIA PREP T8	Type 5 prep did not reformat the track. Track data can be printed by using PREP Type 8.
<i>devnam</i> BOOT AREA CONTAINS ALLOCATED TRACKS	Type 7 prep cannot be performed due to tracks allocated in the area required for EXEC.
<i>devnam</i> , 8405 PACK TYPE MUST BE FIXED	Attempt to change 8405 to removable pack during prep Type 5.
<i>devnam</i> ID <i>pack-id</i> , DRS PACK C0 H0 SNAP INHIBITED	Attempt to snap C0 H0 of a DRS pack.
<i>devnam</i> CAL PACK - CANNOT PREP	Prepping is attempted on a customer engineering calibration pack.
PREP <i>xx devnam</i> , TIMEOUT. A,T PREP <i>xx devnam</i> , READ ONLY ACTIVE. A,T PREP <i>xx devnam</i> , INTERVENTION REQ. A,T	Control unit or device may be physically offline. The read-only switch at the device is active. An error at the device has caused need for operator intervention. O A - causes retry of the operation. O T - causes prep termination.
PREP <i>xx devnam</i> , ERROR MSG COUNT EXCEEDED PREP <i>xx</i> , CONTINUE PREP TYPE? Y,N	Device Errors = 50, may indicate a hardware error. O Y - Prep will continue. Error-counter is set to zero. O N - Prep is terminated.
<i>devnam</i> ID, CYL HD IS ALLOCATED	Type 5 prep is attempting to down a track which contains EXEC files.

Table E-3. Console Messages (continued)

Message	Description/Response
<i>devnam</i> REALLY WANT TO LOSE DATA ON Cxxx Hxx? Y,N	Cxxx Hxx Physical cylinder and head address. O N Track will be left untouched. O Y Track will be flagged defective, data will be lost.
<i>run-id* devnam</i> , TO UP/DOWN CE CYL 560 IS ILLEGAL	A Type 5 prep was initiated on CYL 560 of an 8450 disk drive.
PREP xx <i>devnam</i> , DRS NOT ALLOWED WITH 448 WORD PREP	A Type 7 prep was attempted on a disk drive prepped at 448 words per record.
<i>devnam</i> ID xxxxxx, Cxxx Hxx IS DEFECTIVE	Track to print is flagged defective. Home address and RO are printed.
<i>devnam</i> , PREP NOT IMPLEMENTED FOR SSD PREP	Only Type 4 or Type 8 prep can be performed on an SSD pack.
<i>devnam</i> , NN GOOD READS Cxxx Hxxx	during a Type 3 skip defect prep a cylinder and head was specified with no errors.

E.4. Printer Output

During or following the execution of DPREP, certain information is directed to the printer rather than to the console. This information is either too voluminous to be sent to the console or it is felt that hard copy of the information would be beneficial.

Output from a Type 2 feature is printed with the following headers:

```

PACK ID devnam PROFILE
WDS/REC AVAILABLE TRACKS
PACK ID TRACKS FLAGGED DEFECTIVE ARE
CYL HD FLAGGED BAD ONSITE
CYL HD FACTORY CERTIFIED DEFECTIVE
CYL HD RESERVED FOR PTS TESTING
CYL HD HOME ADDRESS UNREADABLE
FIXED PACK
REMOVABLE PACK
DEFECTIVE TRACK COUNT

```

Output from a Type 8 feature is printed with the following header:

devnam DIR TRK AS READ FROM PACK

Also, during the execution of a feature, the hardware problem diagnostic messages encountered will be directed to the printer. A summary of these is contained in Table E-4.

Table E-4. Hardware Problems

Device Condition Information	Description
Disk System Control/Drive Information: COMMAND REJECT INTERVENTION REQUIRED BUS OUT CHECK EQUIPMENT CHECK DATA CHECK OVER RUN TRACK CONDITION CHECK SEEK CHECK COUNT AREA CHECK TRACK OVER RUN CYLINDER END INVALID SEQUENCE NO RECORD FOUND FILE PROTECTED MISSING ADDRESS MARKER UNSAFE - DISC FILE MALFUNCTION MISSING CLOCK UNEXPECTED END OF FILE UNSOLICITED STATUS DEVICE NOT READY DEVICE OFF LINE PERMANENT ERROR INVALID TRACK FORMAT WRITE INHIBITED OPERATION INCOMPLETE WRITE OPERATION READ OPERATION	These messages are usually provided with supporting sense byte data, and status information. They portray conditions which exist at the Disk Control Unit or Device. Many inhibit a successful prep and may require assistance from Customer Engineering personal to remedy.

E.5. Offline DPREP

Information concerning the offline usage of the Prep package may be found in DA3009 (Diagnostic Test Operations Reference).

E.6. Wall-Clock Time for Prep Operation

The following wall-clock time approximations for prep operation depend upon DPREP 1100 being the only activity in the system. The timings will vary depending upon the number of active runs in the system as DPREP is working in user mode. The timings will also vary depending upon the type of disk. These figures are approximations for 8430 disk packs. The 8430 disk preps take a longer time; the 8405 disk preps are considerably shorter.

5039 C.U.

Type 1	15 Min
Type 2	10 Min
Type 3	20 Min or NA
Type 4	20 Min
Type 5	1 Min per keyin
Type 6	40 Min
Type 7	1 Min
Type 8	2 Min per keyin

5046/5056 C.U.

Type 1	10 Min
Type 2	7 Min
Type 3	NA
Type 4	6 Min
Type 5	1 Min per keyin
Type 6	20 Min
Type 7	1 Min
Type 8	2 Min per keyin